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ARTICLES

Mapping and Matching DNA: Several Legal Complications of "Accurate" Classifications

By AVIAM SOIFER* and MIRIAM WUGMEISTER**

"All Nature's difference keeps all Nature's peace."¹

"Something more is included in our classification than mere resemblance. I believe that something more is . . . propinquity of descent,—the only known cause of the similarity of organic beings."²

Introduction

Classifications are essential to thought. Law is an archetypal classification scheme. The lawyer's stock-in-trade is the recognition and manipulation of classifications. Once instructed in the language of

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1. JOHN ADAMS, DEFENCE OF THE CONSTITUTION OF THE UNITED STATES title page (Leonard W. Levy ed., Da Capo Press 1971) (quoting ALEXANDER POPE, FOURTH EPISTLE, AN ESSAY ON MAN, available in III THE POEMS OF ALEXANDER POPE (Maynard Mack, ed., Methuen & Co. Ltd. 1950)).

2. STEPHEN JAY GOULD, THE FLAMINGO'S SMILE: REFLECTIONS IN NATURAL HISTORY 211 (1985) (quoting Charles Darwin). Gould notes, "Darwin's exterminating angel was, simply, history Numerical precision cannot regulate taxonomy because life unfolds in time. Evolution records a complex, irrevocable history; its pathways were not pre-ordained by simple rules or commanding intelligences." *Id.* at 210. In another essay, Gould makes this point: "All complex human traits are built by an inextricable mixture of varied environments working upon the unfolding of a program bound in inherited DNA We cannot neatly divide any human behavior into a part rigidly determined by biology and a portion subject to external influence. The real issue is *biological* potentiality versus *biological* determinism." *Id.* at 327 (emphasis in original).

law, however, many lawyers begin to assume that legal categories are in some way natural. They help to create but also confine the lawyer's craft. Legal pigeon-holes often take on the quality of Platonic essences.

The best lawyers and judges must understand the importance of knowing the rules and having a sense of the parameters. But it is also crucial to know that rules can be broken and parameters changed. Because classifications are constructed by human beings, classification schemes betray unthinking presuppositions and unconscious prejudices. Classifications tend to feed the yearning for certainty that is the enemy of clear thinking, and they often undermine justice as well. Many assumptions of objective ordering—the building blocks of classification—have been undermined by recent work in science, law, history, and linguistics.³ Legal classifications, nonetheless, remain important constructs, not to be discarded glibly.

Legislation deals in generalities and is designed to give notice to and affect the behavior of numerous people. Adjudication, conversely, is thought to be tailored more precisely to the situations of individual litigants. But these two approaches to law-making overlap in many respects. Legislators often attempt to consider fairness to individuals beyond group identities, particularly when some dramatic incident has focused public attention and prompts legislative response. Adjudication of constitutional issues by the Supreme Court is supposed to take into account the importance of the larger issues a particular case raises, beyond the situation of the individual parties.⁴

3. See, e.g., MARTHA MINOW, MAKING ALL THE DIFFERENCE: INCLUSION, EXCLUSION, AND AMERICAN LAW (1990); DOROTHY NELKIN & LAURENCE TANCREDI, DANGEROUS DIAGNOSTICS: THE SOCIAL POWER OF BIOLOGICAL INFORMATION (1989); PETER NOVICK, THAT NOBLE DREAM: THE "OBJECTIVITY QUESTION" AND THE AMERICAN HISTORICAL PROFESSION (1988); GEORGE LAKOFF, WOMEN, FIRE AND DANGEROUS THINGS: WHAT CATEGORIES REVEAL ABOUT THE MIND (1987); JAMES GLEICK, CHAOS: MAKING A NEW SCIENCE (1987); TAMAR FRANKEL, LEGAL CLASSIFICATIONS (forthcoming; on file with Tamar Frankel at Boston University).

4. A very high percentage of the cases the Court hears comes to it on petitions for certiorari, which it grants not as a matter of right but of judicial discretion, and which it grants only for special and important reasons. SUP. CT. R. 17.1. Additionally, the Court employs numerous techniques, rules, and doctrines to avoid deciding constitutional issues when possible. See generally, CHARLES ALAN WRIGHT, LAW OF THE FEDERAL COURTS (4th ed. 1983). The clearest examples of the Court considering issues beyond the individual litigants before it are holdings the Court applies only prospectively. See, e.g., NLRB v. Wyman-Gordon Co., 394 U.S. 759 (1969) (upholding a rule concerning the production of employee names to future union elections, but not to the parties before the court). See also Larry Yackle, *Form and Function in the Administration of Justice: The Bill of Rights and Federal Habeas Corpus*, 23 U. MICH. J.L. REF. 685 (1990).

Much of the current work of scientists and philosophers, sociologists and political theorists seems to undermine the law's favored image of the rugged, free-willed individual. That hypothetical figure is often proclaimed to be beyond or above classificatory schemes. The explosive issues raised by gene mapping and by the forensic use of DNA tests underscore a basic irony: the more that is known of an individual's unique gene structure, the more such knowledge may be used to burden individuals in employment, to allow scrutiny by government officials, and to invite other privacy-invading actions by both public and private functionaries. Overconfidence in scientific evidence can have profound effects, conceivably as serious as sending a wrongly-accused person to the electric chair, or creating reasonable doubts about guilt. The current ethical debate about the Human Genome Project and the legal battle now raging about DNA identification in criminal law underscore the necessity for clear thought.

Legislative and judicial judgments ought to move past the appealing but ultimately simplistic—even false—practice of resting judgment entirely on the dichotomy between individual and group characteristics.

The first part of this Article discusses the Court's inconsistent use of classification schemes. The second part considers the role of inaccurate classifications in determining individual and collective treatment. The third part explores the problem of underlying statistics or group information used in an only partially accurate classification scheme. In the conclusion, the analysis is connected to a series of questions surrounding the dangers that lurk now that scientists are exploring the margins of our basic understanding of "the propinquity of descent." We are across the threshold of a scientific revolution. Genomes already have been mapped and embryos zapped in startling ways. Our *fin de siècle* stage has begun and a Brave New World may lurk just ahead.⁵

5. For provocative discussions of the ethical implications of these developments, see, e.g., George Annas, *Impact of Gene Maps on Law and Society*, TRIAL, July 1990, at 42; Janet C. Hoefel, *The Dark Side of DNA Profiling: Unreliable Scientific Evidence Meets the Criminal Defendant*, 42 STAN. L. REV. 465 (1990); John B. Attanasio, *The Constitutionality of Regulating Human Genetic Engineering: Where Procreative Liberty and Equal Opportunity Collide*, 53 U. CHI. L. REV. 1274 (1986); John C. Fletcher, *Moral Problems and Ethical Issues in Prospective Human Gene Therapy*, 69 VA. L. REV. 515 (1983).

I. Nature's Difference, Nature's Peace: Inconsistent Use of Group Classifications

Rank injustice seems apparent when anyone is not judged as an individual, yet it also seems unjust if someone does not receive the same treatment as others similarly situated. The Supreme Court held that an individual may be "a legitimate class of one."⁶ Yet the next year the same Justices insisted, as the Court invalidated affirmative action plans by state and local governments, that equal protection demands that individuals be treated as individuals and not in terms of group identity. This fundamental inconsistency both in attitude and in the justifications posited for a wide range of decisions about classifications and individuals is apparent throughout the adjudicatory and legislative systems.

Despite a recent rash of proclamations by the justices of the Supreme Court about the essential quality of individualistic consideration in constitutional law, attention to groups has been a long tradition in equal protection litigation. For more than a century, the Court has concentrated on whether official government action treats a particular class unfairly.⁷ Still more basically, complaints about different treatment because of one's identification with a group—discrimination, in other words—has been a crucial element of our entire legal history, particularly in disputes about social, civil, and political rights.

When faced with a claimed deprivation of a constitutional right, the Court has repeatedly but inconsistently considered group affiliation. In a series of recent discrimination cases, however, the Court justified its basic departure from precedent by insisting that constitutional rights are only to be viewed in relation to a single individual, abstracted from history and tradition. In equal protection and Title VII (employment discrimination) cases, the Court insists that it is appropriate to treat people as individuals and not as members of a

6. *Nixon v. Adm'r Gen. Serv.*, 433 U.S. 425, 472 (1977) (rejecting former President Nixon's bill of attainder challenge to an Act of Congress requiring the General Services Administration to take possession of his presidential papers and recordings). The Court has also held that equal protection demands individual, not group, treatment. *See University of California Regents v. Bakke*, 438 U.S. 265 (1978) (striking down state medical school's affirmative action admissions plan); *see also Wygant v. Jackson Bd. of Educ.*, 476 U.S. 267 (1986) (invalidating an agreement between the board of education and the teachers' union to take race into account in a layoff plan); *City of Richmond v. J.A. Croson Co.*, 488 U.S. 469 (1989) (striking down a 30% local set-aside plan designed by city to benefit minority enterprises).

7. For a cogent discussion of the Supreme Court's enthusiasm for invalidating decisions which it characterized as "class legislation" in early equal protection cases, *see Richard Kay, Equal Protection in the Supreme Court, 1883-1903*, 29 *BUFF. L. REV.* 661 (1980).

group. In construing Fourth Amendment cases, however, the Court has held that probabilistic evidence, and not individualized suspicion, is sufficient to support a stop and search by the police. With the burgeoning developments in technology, specifically in the mapping of the human genome, those who make legal decisions will soon have to determine the appropriate legal relationship between accuracy and classification.

One possible rationale for the Court's inconsistent use of classifications turns on how accurate the Court believes a particular classification to be. If the Court believes certain statistics are highly accurate, or that a generalization has a high probability of producing a correct result, application of that classification will be tolerable. If, however, the Court is less satisfied with the precision of a classification, only individual treatment is appropriate. Although rational, this distinction does not account for the holdings of the Court. In some cases, classifications were very accurate, yet the Court disallowed the use of generalizations.⁸ In other instances, statistics supporting a particular grouping were not accurate, but the Court found a broad generalization sufficient.⁹

Another possible explanation for the Court's focus on individual versus group classification seems more realistic. There may be some information that, regardless of its accuracy, is inappropriate as a guide for legal decision. The current focus on which classifications are appropriate often obscures the real question: whether classifying information, no matter how accurate, sometimes ought not be obtained or utilized. Obtaining accurate information may involve enormous invasions of privacy.¹⁰ Allowing information to be used may have a stigmatizing effect in itself and may create unacceptable harm.

While we seek justice in individual cases, we also distrust ad hoc judgments and loathe excessive discretion. When we want to know and understand a person to assure that justice is done, we must evaluate that individual in a way that is not only inefficient, but also replete

8. See *Los Angeles Dep't of Water & Power v. Manhart*, 435 U. S. 702 (1978). Cf. *Americans with Disabilities Act of 1990*, Pub. L. No. 101-336, 104 Stat. 327 (1990), discussed *infra* notes 26-31 and accompanying text.

9. See *U.S. v. Sokolow*, 490 U.S. 1 (1989), discussed *infra* notes 54-62 and accompanying text.

10. In *International Union, UAW v. Johnson Controls, Inc.*, 499 U.S. 187 (1991), for example, the Court held that prohibiting all women who were capable of bearing children from certain jobs within a lead battery factory was unlawful discrimination because the classification treated all women as potentially pregnant. However, if the company had attempted to exclude only those women who actually were pregnant, by administering weekly urinalyses, it is doubtful the Court would have allowed the policy to stand.

with potential invasions of his or her autonomy, privacy, and sense of self. Thus, there is a double legal paradox. Law may be even less subject to accurate interpretation and manipulation than the double helix in genetics. Distinctions between the associations a person freely chooses and those that law assigns to that person, based on generalities and stereotypes, are tenuous at best. Moreover, the claim of each individual to be treated with equal respect and dignity does not trigger neutrality by decision-makers. Rather, it invites further inquiry about that individual's makeup and background. Such an inquiry must entail comparison. Legal judgment cannot truly be individual judgment. No two persons actually are similarly situated, but no person is an island, either. There is an inherent tension between individual identification and treatment, on the one hand, and the consideration of an individual as a member of a group, on the other.

To what extent does it make sense to isolate individual characteristics in legal judgments? Where along the spectrum from legal judgments based upon general classifications to those based on refined consideration of individual characteristics are there serious inequities? When should a person be treated solely as an individual and when should that individual's involuntary group association, such as with a gender or race, be taken into consideration? When, if ever, should both or either be ignored?¹¹

II. Individual Versus Group Treatment When the Classifications are Inaccurate and Based on Invalid Stereotypes

For the last half century, the idea that we should suspect bias in official actions that adversely affect discrete and insular minorities has dominated legal discussion of discrimination. When "suspect classifications" are utilized by government officials, precedent suggests that judges should strictly scrutinize such government actions. Government officials must demonstrate that they actually furthered a compelling state interest to defend their use of these classifications.

11. For discussions of the role of context in the law, see JOHN T. NOONAN, *PERSONS AND MASKS OF THE LAW* (1976); J. WILLARD HURST, *THE GROWTH OF AMERICAN LAW: THE LAW MAKERS* (1950); LAWRENCE M. FRIEDMAN, *HISTORY OF AMERICAN LAW*, (2d ed. 1985). For a sampling of work by critical legal studies scholars discussing this issue, see *THE POLITICS OF LAW: A PROGRESSIVE CRITIQUE* (David Kairys ed., 2d ed. 1990). Feminist legal scholarship also frequently addresses contextualization. See, e.g., *Feminist Jurisprudence Symposium*, 24 GA. L. REV. 759 (1990); Martha Minow & Elizabeth Spelman, "In Context," 63 S. CAL. L. REV. 1597 (1990).

Additionally, federal and state civil rights legislation since the 1960s has made it clear that adverse impacts along racial or gender lines in employment and housing, for example, will trigger careful judicial scrutiny and generally will require private defendants to prove some bona fide business necessity for using such a challenged classification. Even though recent pronouncements have cut back significantly on the breadth of both statutory and constitutional protections for racial minorities and for women, the Supreme Court ostensibly still accepts the idea that judges ought to review carefully official discriminatory use of race and gender classifications.¹²

Tension between individual and group identification is exposed by the Court's recent insistence that the Equal Protection Clause of the Fourteenth Amendment compels individualized judgments, at least when state and local decisionmaking is challenged.¹³ Justice O'Connor's plurality opinion for the Court in *City of Richmond v. J.A. Croson Co.*¹⁴ invalidated an affirmative action plan by Richmond, Virginia that included a minority set-aside in municipal contracts. Justice O'Connor repeatedly stressed the individual, personal aspect of equal protection guarantees: All citizens have "'personal rights' to be treated with equal dignity and respect." What Justice O'Connor and the plurality perceived as "a patchwork of racial preferences based on statistical generalizations" could not be used to justify Richmond's attempt to remedy the effects of past racial discrimination.¹⁵

Several Justices have gone still further in their insistence on individualized decision-making in both constitutional and statutory contexts. Justice Scalia, for example, concurring in *Croson*, asserted that states may classify by race only in an emergency situation, such as a prison race riot, or to undo their own roles in the maintenance of a system of unlawful racial classification. Otherwise, Scalia argued, only individualized judgments are acceptable because "[t]he relevant proposition is not that it was blacks, or Jews, or Irish who were discriminated against, but that it was individual men and women, 'created equal,' who were discriminated against."¹⁶ Justice Kennedy, dissent-

12. The 1991 Civil Rights Act specifically reversed a number of the Court's recent decisions in an attempt to restore rights limited by the Court. It is unclear how broadly the current Court will interpret these changes.

13. In the affirmative action context, the Court has distinguished sharply between actions by Congress, to which it is still likely to defer, see *Fullilove v. Klutznick*, 448 U.S. 448 (1980) and *Metro Broadcasting, Inc. v. FCC*, 497 U.S. 547 (1990), and actions by state and local governments, which it strictly scrutinizes and generally invalidates.

14. 488 U.S. 469 (1989).

15. *Id.* at 493, 499.

16. *Id.* at 528.

ing from a 1990 decision that allowed a federal government entity to use affirmative action, went so far as to claim that the majority's view "would fit well" with South African apartheid law. Justice Kennedy vehemently attacked what he labelled sardonically as an "unequal but benign" scheme akin to the infamous "separate but equal" approach legitimated by *Plessy v. Ferguson*.¹⁷

Yet the Justices who held "swing" votes in *Croson* and *Metro Broadcasting*, particularly Justices White and Stevens, at other times proclaimed that "[p]rivate biases may be outside the reach of the law, but the law cannot, directly or indirectly, give them effect."¹⁸ Justice White even proclaimed for the Court that in every equal protection case the first question is: "What class is harmed by the legislation, and has it been subjected to a 'tradition of disfavor' by our laws?"¹⁹

It is painfully clear that there is considerable discord among the Justices about whether the initial inquiry in equal protection cases should be focused on group classifications or individual differences. This distinction makes a difference. Constitutional results turn on which question is asked first. If the initial focus is to determine if each individual has personally experienced discrimination, the use of statistics, past practices, and societal norms will be considered irrelevant. If the starting point is instead whether a group has historically been excluded or whether there is a pattern of discrimination, even if individual discrimination may be impossible to prove, a remedy addressing broader social goals is much more likely to result.²⁰

17. *Metro Broadcasting, Inc. v. FCC*, 497 U.S. 547, 638 (1990). Justice Brennan's majority opinion built upon the distinction between broad Congressional discretion and severely limited state and local authority in the implementation of affirmative action programs. This distinction was emphasized in *Croson* to try to distinguish *Fullilove v. Klutznick*, 448 U.S. 448 (1980), and to invoke the perspective of the innocent individual relied upon by Justice Powell in his decisive opinions in *Bakke v. Board of Regents*, 438 U.S. 265 (1978) (Powell, J., providing the deciding vote and announcing the judgment of the Court), and *Wygant v. Jackson Board of Education*, 476 U.S. 267 (1986) (plurality opinion, joined by Chief Justice Burger, then-Justice Rehnquist and, for the most part, Justice O'Connor, invalidating a school board layoff plan that used racial categories to trump seniority claims in some cases).

18. *City of Cleburne v. Cleburne Living Center*, 473 U.S. 432, 448 (1985) (quoting *Palmore v. Sidoti*, 466 U.S. 429, 433 (1984)).

19. 473 U.S. at 453.

20. See *Sheet Metal Workers v. EEOC*, 478 U.S. 421 (1986). While imposing a 29% nonwhite membership goal as a remedy for egregious discrimination in hiring, promotion, and representation by a union, Justice Brennan stated that "[t]he purpose of affirmative action is not to make identified victims whole, but rather to dismantle prior patterns of employment discrimination and to prevent discrimination in the future. Such relief is provided to the class as a whole rather than to individual members; no individual is entitled to

III. Accuracy and Inaccuracy of Classifications

The current Court seems to give credence only to claims based on personally experienced discrimination. The insistent individualism of *Los Angeles Department of Water and Power v. Manhart*²¹ and its progeny—individualism that runs against even accurate information about group identities—already has been proclaimed to be the crux of all equal protection analysis by four Justices. Justice O'Connor began her dissent in *Metro Broadcasting* with the following assertion: "At the heart of the Constitution's guarantee of equal protection lies the simple command that the Government must treat citizens 'as individuals,' not as simply components of a racial, religious, sexual or national class."²² For this proposition, Justice O'Connor quoted *Arizona Governing Committee v. Norris*,²³ a statutory decision that extended *Manhart*'s view of Title VII to invalidate the gender-based differential retirement benefit Arizona had offered as an option for state employees. This quick conflation of statutory and constitutional standards suggests the vehemence of the Court's doctrinal debate, and the difficulty inherent in the classification discrimination dilemma.

In these opinions, the Justices have been disingenuous. Insistence on individualism under the equal protection clause is an oxymoron. What does it mean to be discriminated against if not that one is treated according to a stereotype, based on misperceptions about a group with which an individual is associated? It is only in relation to a group, to historical and traditional affiliations, that discrimination based on gender or race has meaning. To remedy discrimination, legal judgments must look to history rather than to each individual's situation today. Only current and past group identification will determine

relief, and beneficiaries need not show that they were themselves victims of discrimination." *Id.* at 474.

21. 435 U.S. 702 (1978), discussed *infra* notes 26-31.

22. 497 U.S. at 602. Justice O'Connor was joined by Chief Justice Rehnquist and Justices Scalia and Kennedy. With this decade's many changes in the Court's personnel, it is somewhat difficult to predict new configurations on the Court. It even has been difficult to find consistency within a single Justice's opinions in this context. For example, Justice Brennan was the author of the majority opinion in *Metro Broadcasting*, which deferred to the judgment of Congress and the FCC that "expanded minority ownership will, in the aggregate, result in greater broadcasting diversity." *Id.* at 3016. But compare Justice Brennan's majority opinion in *Craig v. Boren*, 429 U.S. 190 (1976), which derided Oklahoma's use of statistics to defend its gender based distinction allowing 18-year old females to purchase 3.2 beer, but requiring males to be 21 years old to purchase the same beer. "[P]roving broad sociological propositions by statistics is a dubious business, and one that inevitably is in tension with the normative philosophy that underlies the Equal Protection Clause." *Id.* at 204 (footnote omitted).

23. 463 U.S. 1073, 1083 (1983).

if future action is needed. Two individuals are never identical. Therefore, to state that discrimination is only concerned with individuals is to remove context, history, and, ultimately, meaning from the equal protection analysis.

If the Court actually were to try to ensure fairness to individuals (and to ensure that those who have not been personally disadvantaged do not receive an unearned boon), the Court's willingness to accept a categorization would be directly related to its accuracy. Yet, even when a classification is almost certainly accurate, as was the use of African-American race as a shorthand for past discrimination in *Croson*, the Court has held that only individual and not group discrimination may be remedied under the Fourteenth Amendment. By concentrating on individualism, the Court is obfuscating what may in fact be its underlying belief: status discrimination may no longer be a cognizable claim under the Equal Protection Clause.²⁴

IV. Individual Versus Group When Classifications Are Partially Accurate

An issue the Supreme Court has addressed several times, but has only further muddled, is what the appropriate legal standard ought to be when race or gender serves as an accurate marker. For instance, in upholding the denial of disability benefits for pregnant women in the face of an equal protection attack, the Court held that California did not discriminate between men and women in its disability insurance scheme, but merely divided people into "two groups—pregnant women and nonpregnant persons."²⁵ At nearly the same time, the Court held that at least some differential treatment based on accurate generalizations violated Title VII of the 1964 Civil Rights Act.

A. Real Differences in Life Expectancy

Even when a characteristic on which a decision is based is accurate, the Court may not allow it to be used. In *Los Angeles Depart-*

24. See Aviam Soifer, *On Being Overly Discrete and Insular: Involuntary Groups and The Anglo-American Judicial Tradition*, 48 WASH. & LEE L. REV. 381 (1991) and the colloquium comments that follow.

25. *Geduldig v. Aiello*, 417 U.S. 484, 496 n.20 (1974) (holding that the California plan was not a denial of equal protection because it rested on "objective and wholly non-invidious basis," and there was no risk women would be protected but not men, or vice versa); see also *General Electric v. Gilbert*, 429 U.S. 125 (1976) (holding that Title VII of the 1964 Civil Rights Act did not bar exclusion from private disability plans as a statutory matter). Congress rejected *Gilbert* by amending Title VII to include pregnancy as a disability in the Pregnancy Discrimination Act of 1978, 42 U.S.C. § 2000e(k) (1988).

ment of Water & Power v. Manhart,²⁶ Justice Stevens's majority opinion invalidated a city pension plan that required female employees to contribute more than male employees each month. The plan was held to be a forbidden form of gender discrimination. Justice Stevens acknowledged that, as an actuarial matter, women live longer than men, but he insisted that Title VII prohibits "treatment of individuals as simply components of a racial, religious, sexual, or national class."²⁷ Indeed, Justice Stevens insisted on individualized judgments so vehemently that he proclaimed, "a true generalization about the class is an insufficient reason for disqualifying an individual to whom the generalization does not apply."²⁸ Underlying *Manhart* is the belief that if a statistically accurate generalization results in an unfair result for one individual, it must fail. Unless the accuracy of a probabalistic prediction is 100%, no statistical basis for such a decision is tolerable.

The heart of *Manhart*²⁹ seems to make suspect all insurance and retirement plans connected to employment covered by Title VII if they treat people of one gender differently.³⁰ *Manhart* is also noteworthy for its faith in individualized decision-making. Finally, the *Manhart* line of cases suggests that, at least as a statutory matter, the distinction between individual identity and group identity is crucial. Even accurate generalizations about racial, ethnic, gender, and national-origin groupings must be kept out of sight and, ideally, out of mind.³¹

B. Classification Under the ADA

The invalidation of accurate generalizations in *Manhart* and subsequent decisions seems even more troublesome when these cases are compared to recent federal statutes that address additional categories of accurate information in the context of employment. Title I of the Americans with Disabilities Act of 1990 (ADA), for example, is a

26. 435 U.S. 702 (1978). Chief Justice Burger, joined by then-Justice Rehnquist, dissented.

27. *Id.* at 708.

28. *Id.*

29. How do people with such names find the right cases with which to be associated?

30. In *Arizona Governing Comm. v. Norris*, 463 U.S. 1073 (1983), a badly splintered Court extended *Manhart*. It held that Title VII prohibits a state from offering state employees a voluntary pension plan, including the option of receiving benefits from several companies selected by the state, when based on the longer life expectancy of women as a group. All of the insurance companies paid women lower monthly retirement benefits than men who made the same contributions.

31. *Manhart* and its progeny may demonstrate that sometimes the good drives out the actuarial.

comprehensive effort to forbid discrimination against "disabled qualified individuals."³² The ADA defines disability broadly. "Disability" includes any "impairment that substantially limits one or more of the major life activities of an individual; having a record of such an impairment, or being regarded as having such an impairment."³³ The ADA's reach is extensive. The statute covers all private employers and unions with fifteen or more workers, as well as all state and local government entities.³⁴ Even when an employer knows that an individual is impaired—when the basis for the decision would be entirely accurate—the employer not only may not discriminate against the employee "differently," but the employer generally must make special accommodations so that the employee can function with ease.

Ironically, the ADA specifically exempts the insurance industry from its extensive coverage. The ADA allows insurance companies to continue to base all of their assumptions and rates on generalized statistics, thereby treating people only in relation to the group to which they belong. The statute, and particularly the Senate Report, make clear that insurers and employers remain free to offer the same insurance products and to make the same actuarial judgments they made before the ADA was passed.

Only in the case of "subterfuge" is the ADA likely even to touch discrimination against persons with disabilities in providing insurance services or in assessing actuarial risk. Therefore, this statute tries to

32. Pub. L. No. 101-336, 104 Stat. 327 (1990). For a useful synopsis of the bill's provisions, see, *EEOC Policy Guidance on Enforcement of the Americans with Disabilities Act of 1990*, 169 DAILY LAB. REP. (BNA) D-1 (August 30, 1990).

33. Americans with Disabilities Act of 1990 § 102(a), 42 U.S.C. § 12102(a) (1990).

34. The ADA prohibits medical examinations and inquiries about job applicants until job offers are made. Even medical examinations and inquiries concerning actual employees are prohibited, unless the employer can prove that they are job-related and consistent with business necessity. Moreover, even when such narrowly-tailored inquiries are allowed, the ADA mandates that the results be collected on separate forms and kept in separate files, and they must remain confidential. Prohibiting discrimination against the disabled in employment, the ADA requires that an employer make "reasonable accommodation" to take into account an otherwise qualified individual's disability, unless the employer can demonstrate undue hardship. While the ADA does not ban testing for illegal drug use, it does protect rehabilitated drug users or those in rehabilitation programs and alcoholics, and it appears to include persons with AIDS in its coverage of most occupations. See Americans with Disabilities Act of 1990 § 104, 42 U.S.C. § 12114 (1990). The ADA seems to disallow the New York Transit Authority's banning all persons in methadone maintenance programs from employment, for example. That policy was upheld against a constitutional attack in *New York City Transit Authority v. Beazer*, 440 U.S. 568 (1979). For a precis of the statute's implications for litigation related to AIDS, see *Legal Experts Predict New Areas of AIDS Litigation in the 1990s*, 152 DAILY LAB. REP. (BNA) A-3 (August 7, 1990).

have it both ways: people are to be evaluated and treated both as individuals and as members of groups. If the Court focuses its interpretation of the ADA on individual versus group classifications, it will miss a basic point of the statute. The type of classification actually is not the central issue. The ADA prohibits an employer from treating a disabled person as a member of a unique class. Yet insurance providers are free to utilize probabilistic statistics which will sometimes result in unfairness to an individual. The legislation both allows and proscribes treatment of an individual as a member of a group. The ADA is thus concerned with something other than individual versus group identification or with the accuracy of actuarial tables.

What Congress attempted to protect through the ADA is the privacy of individual employees. Even more significantly, Congress sought to avoid the stigma to which an individual employee might be exposed were an employer permitted to take impairments into account when making a decision.³⁵

C. Protection of Perpetually Pregnant Workers

Fetal protection plans established by employers underscore the problem of generalizations, group identity, and probabilities. In *International Union, UAW v. Johnson Controls, Inc.*, the Seventh Circuit,³⁶ and then the Supreme Court,³⁷ struggled to determine whether the fact that only women get pregnant might justify excluding all women who could potentially become pregnant from jobs in which workers were exposed to high concentrations of lead. The Supreme Court's decision that the employer's policy of exclusion could not be justified as a way of protecting fetuses from the "adverse consequences" of

35. In *Arizona Governing Committee v. Norris*, 463 U.S. 1073 (1983), Justice Marshall, writing for the Court, compared sex based discrimination to race based discrimination. "If petitioners' interpretation of the statute were correct, such studies could be used as a justification for paying employees of one race lower monthly benefits than employees of another race. We continue to believe that a 'statute that was designed to make race irrelevant in the employment market' [footnote omitted], could not reasonably be construed to permit such a racial classification. And if it would be unlawful to use race based actuarial tables, it must also be unlawful to use sex based tables . . ." *Id.* at 1083. As articulated in *Brown v. Board of Education*, 347 U.S. 483 (1954), race-based classifications are prohibited not only because they are inaccurate, but also because they are stigmatizing: "To separate some students from others of similar age and qualifications solely because of their race generates a feeling of inferiority as to their status in the community that may affect their hearts and minds in a way unlikely ever to be undone." *Id.* at 494.

36. 886 F.2d 871 (7th Cir. 1989) (en banc) (holding that the employer was justified in excluding all women with the ability to become pregnant from jobs in which they were exposed to high concentrations of lead).

37. 499 U.S. 187 (1991) (reversing the 7th Circuit decision).

exposure to lead is comprehensible under a number of theories. Yet an unspoken rationale appears central to the Court's holding.

The "fetal protection plan" adopted by Johnson Controls excluded all women under the age of 70 from jobs with high lead exposure. "Fertile" women were also excluded from any job which might eventually lead to promotion into a job with high lead exposure.³⁸ The only women allowed to retain jobs in high exposure areas were "those whose inability to bear children [was] medically documented."³⁹ The company considered and rejected narrower exclusion policies, such as those limiting the exclusion to women who were actually pregnant or women who were attempting to become pregnant because "one of the exigencies of life, [is] the frequency of unplanned or undetected pregnancies."⁴⁰

The basis on which the Seventh Circuit upheld the employer's plan was that women cannot be trusted to control their bodies and their reproduction. All women capable of childbirth, the majority's syllogistic reasoning suggested, must be considered not simply potentially pregnant, but perpetually pregnant. Judge Coffey's majority opinion seemed to distrust the rationality of individual women, as it upheld a policy in which it was the obligation of the employer to protect unborn children from the vicissitudes of their mothers.⁴¹

Because only women can bear children, the Seventh Circuit concluded, it was sensible to draw a distinction between those who may be capable of pregnancy and those who are not. In determining the proper classification, Judge Coffey progressed from the particular—pregnant women—to the general—all women capable of pregnancy. This faulty inductive reasoning, resulting in broad categorization

38. 886 F.2d at 907 (Posner, J., dissenting).

39. *Id.* at 876 n.8.

40. *Id.* at 878.

41. *Id.* at 897 ("[I]t would not be improbable that a female employee might somehow rationally discount this clear risk in her hope and belief that her infant would not be adversely affected from lead exposure."). This point was directly addressed by Judge Easterbrook in dissent:

No legal or ethical principle compels or allows Johnson to assume that women are less able than men to make intelligent decisions about the welfare of the next generation, that the interests of the next generation always trump the interests of living woman (sic), and that the only acceptable level of risk is zero. 'The purpose of Title VII is to allow the individual woman to make that choice for herself.'

Id. at 913 (Easterbrook, J., dissenting) (quoting *Dothard v. Rawlinson*, 433 U.S. 321, 335 (1977)).

rather than individual consideration, exemplifies the form of logic criticized by the Supreme Court in *Manhart*.⁴²

At first blush the Supreme Court's invalidation of the fetal protection program and its rejection of the Seventh Circuit's reasoning seems a logical continuation of *Manhart*. The exclusion of all fertile women did not come close to accurately approximating the class of those who are likely to become pregnant. As Justice Blackmun pointed out in his opinion for the Court, "national statistics show that approximately nine percent of all fertile women become pregnant each year. The birthrate drops to two percent for blue collar workers over age 30." Not only did the plan treat unfairly a woman who was fertile and who would not become pregnant, but it was overwhelmingly inaccurate as a statistical matter.⁴³

The Court's very focus on the inaccuracy of the exclusion policy leaves open the possibility that, were an accurate measure possible—one that resulted in the exclusion only of women actually pregnant—it might be permissible. The Court, however, also justified its decision by drawing distinctions between individuals and groups. The majority opinion stated that a fetal protection policy excluding fertile women was facially discriminatory. The company policy placed a burden on female employees that it did not place on males. Therefore, the policy could only be justified on the basis of a bona fide occupational qualification ("BFOQ").⁴⁴

In *Johnson Controls*, the Court pointed out that the BFOQ exception has been read narrowly and has been upheld only when an individual's status or association with a group interfered with her or his ability to perform the job at issue.⁴⁵ Despite repeated references to individual choice and the need to treat each member of the work

42. 435 U.S. 792 (1978). Despite the fact that women do live longer on average than men and will, therefore, receive more payments than men on an actuarial basis, the Court held that under Title VII all employees must be treated as individuals, not as members of a group. *Johnson Controls*, 499 U.S. at 207. There is thus a significant class (blue collar) within the larger statistical class (fertile women).

43. National statistics, as well as a review of the women who became pregnant within Johnson Controls' own work force, made it "apparent that Johnson Controls is concerned about only a small minority of women. Of the eight pregnancies reported among the female employees, it has not been shown that any of the babies have birth defects or other abnormalities." *Id.* at 207.

44. *Id.* at 197-200. A BFOQ allows an employer to exclude an individual on the basis of religion, sex, or national origin if that status is "reasonably necessary to the normal operation of that particular business or enterprise." See *Dothard v. Rawlinson*, 433 U.S. 321 (1977); *Western Airlines v. Criswell*, 472 U.S. 400 (1985).

45. 499 U.S. at 205 ("Congress indicated that the employer may take into account only the woman's ability to get her job done.").

force as an individual,⁴⁶ the Court in *Johnson Controls* concluded that a BFOQ analysis proscribes treating women as women. Women must be dealt with as if they are genderless workers. Title VII, as amended by the Pregnancy Disability Act (PDA),⁴⁷ requires that "women as capable of doing their jobs as their male counterparts may not be forced to choose between having a child and having a job."⁴⁸ This reading of Title VII is quite different from that in *Manhart*. Even if an employer knew with perfect accuracy which individuals were pregnant, that employer would be prohibited from treating pregnant employees differently from non-pregnant female or male workers.

A woman must be treated no differently from a man not because associating pregnancy with women is inaccurate, nor because each woman must be treated as an individual. Rather, treating women on a different basis, either because they may become or are already pregnant, is an evil that Title VII, as amended by the PDA, tried to eliminate. The Court's focus on individualism and statistical accuracy in *Johnson Controls* once again obfuscates the central issue. Fetal protection policies do more than limit employment opportunities, they also may stigmatize. Moreover, they easily can be used to infringe upon the autonomy and privacy of potential parents. As Justice Blackmun put it: "Decisions about the welfare of future children must be left to the parents who conceive, bear, support, and raise them rather than to the employers who hire those parents."⁴⁹

46. *Id.* at 206 ("With the PDA, Congress made clear that the decision to become pregnant or to work while being either pregnant or capable of becoming pregnant was reserved for each individual woman to make for herself.").

47. 42 U.S.C. § 2000e (1994).

48. *Id.* at 204-205. The PDA "mandates that pregnant employees 'shall be treated the same for all employment-related purposes,' as nonpregnant employees similarly situated with respect to their ability or inability to work . . ." *Id.* (quoting California Fed. Sav. & Loan Ass'n v. Guerra, 479 U.S. 272, 297 (1987) (White, J., dissenting)).

Ironically, *Guerra* held that Title VII had not been violated by a state law which required employers to grant reinstatement to workers who took disability leave due to pregnancy. In dissent, Justice White argued that the state law gave a special preference to pregnant workers, which he believed violated Title VII's requirement of neutrality in making an employment decision about a member of a protected status group.

The *Guerra* result allows employers to reinstate workers returning from pregnancy leave but deny reinstatement to employees who return after any other type of disability leave. The Court stated that the PDA was intended to be "a floor beneath which pregnancy disability benefits may not drop—not a ceiling above which they may not rise." 479 U.S. at 285 (quoting California Fed. Sav. & Loan Ass'n v. Guerra, 758 F.2d 390, 396 (9th Cir. 1985)).

49. *Id.* at 206.

D. "Reasonable Suspicion": Satisfying Fourth Amendment Individuality and the Requirements for Group Generalizations

It is hardly surprising that the tension between individual and group identity is recapitulated in the realm of criminal law. Those who claim to be pure interpretivists or strict constructionists of the Constitution run into trouble, for example, when forced to confront the Fourth Amendment's language which guarantees "[t]he right of the people to be secure in their persons, houses, papers, and effects against *unreasonable* searches and seizures. . . ."⁵⁰ The Constitution, for over a century, has been held to require some aspects of the federal criminal process to protect individual privacy concerns.⁵¹ More recently, Fourth Amendment protections have inhibited state criminal procedures as well. The Court has labored to establish safeguards that limit the discretion of police officers⁵² and to ensure that when officers act they do so on the basis of reliable information.⁵³ This doctrinal work has been done largely in the name of individualism and accuracy. Nevertheless, recent decisions, such as those involving drug courier profiles, undermine the individualistic reasoning proffered by the Court.

*United States v. Sokolow*⁵⁴ provides a good recent example of the problematic constitutional backdrop. In *Sokolow*, the majority emphasized a "totality of the circumstances" approach to ascertain whether grounds for "reasonable suspicion" existed sufficient to allow Drug Enforcement Agency (DEA) agents to stop an airport traveller. Chief Justice Rehnquist's majority opinion rejected the Ninth Circuit's effort to divide the evidence that might form reasonable suspicion into

50. U.S. CONST. amend. IV (emphasis added).

51. *Boyd v. United States*, 116 U.S. 616 (1886) (holding that the Fourth and Fifth Amendments protect defendants from federal government efforts to compel protected documents). For a review of doctrinal history, and a fine analysis of recent decisions, see Tracey Maclin, *Constructing Fourth Amendment Principles from the Government Perspective: Whose Amendment Is It, Anyway?*, 25 AM. CRIM. L. REV. 669 (1988).

52. *Terry v. Ohio*, 392 U.S. 1 (1968) (holding that when an officer has reasonable suspicion that an individual is armed and dangerous, a stop may be warranted); *Alabama v. White*, 496 U.S. 325 (1990) (finding that reasonable suspicion is sufficient to stop and search).

53. *Aguilar v. Texas*, 378 U.S. 108 (1964) (requiring both independent validation and reliability for a warrant to be issued based on an informant's tip); *Spinelli v. United States*, 393 U.S. 410 (1969) (holding that a tip may be found trustworthy when both the veracity and the basis of the tipper's knowledge can be independently ascertained); *Illinois v. Gates*, 462 U.S. 213 (1983) (adopting totality of the circumstances test, "a fair probability," to determine if information on which officers relied was accurate).

54. 490 U.S. 1 (1989).

a more reliable category of evidence of "ongoing criminal behavior" on one hand, and less reliable "probabilistic evidence," such as the belief that a suspect matched one of the DEA's "drug courier profiles," on the other.⁵⁵ In reversing the lower court's finding that there was an inadequate basis for the DEA stop, Rehnquist stressed that probabilistic factors "also have probative significance."⁵⁶ Therefore, the majority concluded, despite the fact that probabilistic factors are set forth in a general profile that includes numerous false positives, the use of those profiles does not detract from the evidentiary significance in matching such factors to the profile when it is "a trained agent" who does the matching.⁵⁷

This holding is seriously at odds with previous decisions in the Fourth Amendment area. For a considerable time, the right to be free from "unreasonable" searches and seizures was equated with the right to be free from arbitrary government action. Under a long line of precedents, the grant of discretion to officers in the field would have been sufficient to invalidate a search or a seizure.⁵⁸

In dissent, Justice Marshall decried the "mechanistic application of a formula of personal and behavioral traits in deciding whom to detain."⁵⁹ He agreed with the lower court that a careful review of

55. *Id.* at 8, 10. "Reasonable suspicion" is a lesser requirement derived from the Fourth Amendment requirement of probable cause. It allows law enforcement personnel greater leeway in making brief detentions necessitated by pressing exigencies such as the need to stop ongoing crimes or to protect themselves in dangerous situations. *Terry v. Ohio*, 392 U.S. 1 (1968). Since 1974, the DEA has trained narcotics officers in the use of "drug courier profiles" to identify drug smugglers on the basis of circumstantial evidence. For example, the agents claimed that because Andrew Sokolow paid for his ticket in cash from a large roll of \$20 bills, appeared to be traveling under an assumed name, and travelled in July from Honolulu to Miami and back—a trip that took 20 hours though he spent only 48 hours in Miami—he fit one of their drug smuggler profiles closely enough to warrant suspicion and to justify a detention.

56. *Id.* at 8.

57. *Id.* at 10. As the dissenters stressed, the majority did not rely exclusively on the use of probabilistic profile evidence. Therefore the holding in *Sokolow* arguably may be limited to its facts. As a predictive matter, however, this was probably wishful thinking by Justices Marshall and Brennan.

58. The warrant requirement is based on the assumption that police discretion must be curtailed by a "neutral detached magistrate." *Johnson v. United States*, 333 U.S. 10, 14 (1947); see *Coolidge v. New Hampshire*, 403 U.S. 443 (1971); *Ybarra v. Illinois*, 444 U.S. 85 (1979) (holding that a search warrant authorizing a search of a bar was insufficient to justify the search of patrons who happened to be on the premises when the search was executed: "[A] person's mere propinquity to others independently suspected of criminal activity does not, without more, give rise to probable cause to search that person." *Id.* at 91.); *Arizona v. Hicks*, 480 U.S. 321 (1987) (Scalia, J.) (holding that even when police lawfully entered an apartment, they were not authorized to move stereo equipment and execute a search on less than probable cause).

59. 490 U.S. at 13.

cases considering DEA use of profiles demonstrated "the profile's 'chameleon-like way of adapting to any particular set of observations.'"⁶⁰ To the dissenters, the Fourth Amendment requires "specific and articulable facts"⁶¹ to ensure that innocent individuals will not be harassed or detained. That requirement could not be satisfied by consideration of past crimes, criminal designs, or a propensity to commit crimes. The dissent assailed the majority for ducking "serious issues relating to a questionable law enforcement practice" when the majority refused to confront the implications of reliance upon "a prefabricated profile of criminal characteristics."⁶²

The two sides in the *Sokolow* debate envision starkly contrasting levels of ability—and good faith—in officials in the trenches. But the entire Court continues to disagree or to refuse to address how much probabilistic suspicion is enough to justify state action.⁶³ The issue of "how much" evidence is sufficient and how accurate that evidence must be lies at the heart of the burgeoning debate over the admission of DNA fingerprinting in criminal cases.

E. Confronting New Science, Creating New Classification Controversies

The Court's insistence on individualized judgment in the *Manhart-Norris* line of cases contrasts with both *Sokolow* and the ADA's denial of employer access to, or even inquiry about, individual medical information or history. Ironically, in discrimination cases the Court increasingly emphasizes individualism while in the criminal law context group characterizations are increasingly legitimized. The

60. *Id.* (quoting *U.S. v. Sokolow*, 831 F.2d 1413, 1418 (9th Cir. 1987)). Thus, in some cases, the suspects match the profile because they are travelling alone; in others because they are travelling with a companion; in some, because they have one-way tickets; in others, because they have round-trip tickets, and so forth. 490 U.S. at 15-16.

61. *Id.* at 12 (quoting *Terry v. Ohio*, 392 U.S. 1, 21 (1968)).

62. *Id.* at 14. The dissent seems inconsistent in attacking the profiles as both "chameleon-like" and as overly "mechanistic" and "prefabricated" in actual use. This may be because the dissenters were distrustful of the way in which the profiles were used, and they suspected that the profiles tended to be invoked to supply post hoc rationalizations for reliance on drug agents' hunches or their use of inappropriate criteria, such as racial and ethnic characteristics.

63. Recent cases demonstrate that the current Court is sweeping away the probable cause standard and upholding police actions based on little or no cause. *California v. Hodari D.*, 499 U.S. 621 (1991) (finding that a youth's flight at the approach of an unmarked police car was sufficient evidence to justify the police to chase the youth in a police car and on foot, to tackle and handcuff him); *Florida v. Bostick*, 501 U.S. 429 (1991) (determining that when the police boarded a stopped bus and, without any articulable suspicion, questioned and searched an individual and his luggage, no constitutional violation took place).

irony deepens when we recognize that it is already possible to learn a great deal about each unique individual from tiny samples of DNA—samples available from that individual's mere presence in a room. These samples are available as a result of bits of hair or skin that she or he "sheds." Indeed, providing such "samples" is also already required as a condition of parole in some states.

A person's line of descent is obviously of considerable interest in paternity litigation, as it is in potentially many other areas of family law and the law of trusts and estates. But beyond the courtroom, the likelihood that an individual may acquire diseases or have a tendency to display particular characteristics may be crucial information for potential employers, and especially important to insurance companies.⁶⁴

This raises the specter of genetic discrimination and invasion not only of one's "active" secrets, but also of one's past and future. It will probably soon be possible, for example, to know precisely a person's line of descent over many generations. It is also becoming possible to discern proclivities for a vast and ever-increasing number of diseases. To cite just one example of the abuses that can result from gene testing, when a pregnant woman's fetus tested positive for cystic fibrosis, her insurance company refused to provide medical coverage for the child. The parents were left with two options: either abort the child or struggle alone to meet the financial burden of a child who would require extensive medical care.⁶⁵ Though the conflict was eventually resolved, it aroused fear among medical geneticists that such problems will become widespread as gene screening tests become more available and doctors gain the ability to predict which infants will be born with inherited disorders and more common illnesses, such as cancer and heart disease. Currently, all fifty states require screening of newborns for certain diseases, including congenital ones, and optional prenatal testing is increasing as parents seek information about possible disorders their children may inherit. Eventually, genetic screening will move from testing only fetuses to testing adults, opening even more forms of possible discrimination premised on an individual's genetic make-up.

64. *Genetic Testing May Mark Some People as Undesirable to Employers, Insurers*, WASH. POST, July 9, 1990.

65. Larry Thompson, *The Price of Knowledge: Genetic Tests that Predict Dire Conditions Become a Two-edged Sword*, WASH. POST, Oct. 10, 1989, at Z7.

1. *The Evidentiary Weight of DNA Information*

The growing controversy over DNA mapping evidence in the criminal area raises the question of how deferential courts ought to be toward the probabilistic suppositions of law enforcement officials. In a sense, of course, all evidence is probabilistic. To be sure, there are important differences between the unspoken calculations of probabilities in our intuitions as we make judgments about credibility, for example, and explicit evidence of probabilities in statistical evidence. Yet a recurring fundamental question remains: how overwhelming must probabilities be to allow the legal decision-maker to decide?

By January 1990, DNA evidence had been admitted in 38 states and in U.S. military tribunals.⁶⁶ Since then, decisions in several more jurisdictions have joined the trend toward admitting such evidence, including the determination by a federal magistrate to admit DNA evidence in a federal trial, following an extensive six-week hearing on the question.⁶⁷ For 70 years the basic judicial approach to the admission of scientific evidence involved a determination of whether proffered evidence (1) was "generally accepted" in the scientific community to which it belonged and (2) whether the proffered expert testimony was relevant.⁶⁸ The same test has been used by virtually every court that has considered the admissibility of DNA evidence.

In June 1993, however, the U.S. Supreme Court held that the "general acceptance" test was superseded by the adoption of the Federal Rules of Evidence. The focus shifted from the breadth of acceptance of a scientific theory to an examination of the methodology used to determine whether DNA evidence offered in court (1) is based on "scientific, technical, or other specialized knowledge" and (2) "will as-

66. OFFICE OF TECHNOLOGY ASSESSMENT, U.S. CONGRESS, *GENETIC WITNESS: FORENSIC USES OF DNA* 157 (1990).

67. Bishop, *A Victory for Genetic Fingerprinting*, N.Y. TIMES, Nov. 16, 1990, at B6 (describing Federal Magistrate James E. Carr's decision in *United States v. Yee*, No. 3, 89 CR 720 (N.D. Ohio, filed March 3, 1989) (holding that experts need not agree on admissibility of novel scientific evidence in specific case in order for DNA test to be admissible based on its general acceptance as reliable)).

68. For a concise description of the long-standing legal admissibility test for scientific evidence, derived from *Frye v. United States*, 293 F.2d 1013 (D.C. Cir. 1923) and the Federal Rules of Evidence, see *DNA as Evidence*, in *GENETIC WITNESS*, *supra* note 66, ch. 4. For a discussion of dissenting views, see, e.g., Julie Gannon Shoop, *Is DNA Typing Ready for Trial?*, TRIAL, Sept. 1990, at 11; Hoeffel, *supra* note 5. A leading decision against admission of DNA typing was that by New York Supreme Court Acting Justice Gerald Sheindlin in *People v. Castro*, 545 N.Y.S.2d 985 (Bronx Cty. Ct. 1989) (evidence of DNA match ruled inadmissible in double murder case based on laboratory failures).

sist the trier of fact to understand the evidence or to determine a fact in issue."⁶⁹

The preliminary step to determine whether proffered evidence is based on scientific knowledge requires an inquiry whether "the reasoning or methodology underlying the testimony is scientifically valid and whether that reasoning or methodology properly can be applied to the facts in issue."⁷⁰ Although no single factor serves as a litmus test for determining the validity of scientific knowledge, the focus on reliability and methodology requires an inquiry into whether the theory or technology (1) can be tested, (2) has been subjected to peer review, (3) has a high known or potential rate of error, and (4) is generally accepted by the scientific community. Judges still retain the ability to screen out purportedly scientific evidence because they are supposed to ensure that scientific evidence is not only relevant, but *reliable*.

Critics, particularly defense attorneys, tend not to dispute the underlying scientific basis of DNA matching. Rather, they concentrate on numerous ways in which lab techniques and human error enter the process. This, they claim, makes what a judge or jury might take to be firm and objective scientific evidence actually the product of a vast series of subjective judgments and potential errors. Yet the Office of Technology Assessment reported in July, 1990 that it is now clear that "forensic uses of DNA tests are both reliable and valid when properly performed and analyzed by skilled personnel" and that such tests "can provide more definitive and objective evidence to ascertain the innocence of an individual—especially compared to subjective evidence such as eyewitness testimony."⁷¹

With the exception of identical twins, all human beings have different DNA. Those differences can now be detected readily. To state the point in its most elementary form: simple and inexpensive laboratory tests now make it possible to determine whether there is a match or not in the DNA available in all body cells (except blood cells) when compared to a sample from any other body cells. The hotly-debated legal issue about DNA matching in criminal cases, and to a lesser degree in paternity suits, is fundamentally about quality assurance. Decisions such as *Sokolow* involved analogous issues. The Court's

69. *Daubert v. Merrell Dow Pharmaceuticals*, 113 S. Ct. 2786, 2796 (quoting Fed. R. Evid. 702).

70. *Id.* at 2796-97.

71. GENETIC WITNESS, *supra* note 66, at 7-8. In his introduction, OTA Director John H. Gibbons states that "no scientific doubt remains that technologies already available can accurately detect genetic differences between humans." *Id.* at iii.

willingness simply to assume the expertise of law enforcement personnel is particularly chilling if it is followed in the context of DNA matching. The controversy swirls around laboratory technique and the subjectivity of those interpreting the DNA tests, not around the underlying "science."⁷²

2. *Prospective Issues in DNA Mapping*

If method and technique remain the critical issues, it seems likely that regulation of laboratories, and perhaps even the ideas of a national databank and enforced, computer-based uniformity, may result.⁷³ Such a databank, however, raises profound privacy and due process issues, as well as the problem of the disparate resources available to the prosecution and the defense in most criminal cases. Increased sophistication about DNA mapping may also implicate concerns about potential discrimination on the basis of involuntary groups.⁷⁴ The Office of Technology Assessment should not so blithely state:

A population statistics database might someday yield information useful for additional investigative purposes. Population statistics on particular alleles are currently generated by racial and ethnic classifications, since allele size and frequency can vary widely among such groups. This information could be used by police to narrow the field of potential suspects. For instance, if it is known that an allele of size 'x' appears in only 0.2 percent of the Asian population, but appears in 10.0 percent of Hispanic Americans, investigators armed with test results might concentrate their efforts on Hispanic rather than Asian suspects, partic-

72. This view was stated explicitly in a report by National Academy of Sciences, National Research Council on DNA Technology in Forensic Science Report, which studied the technique and use of DNA fingerprinting in criminal cases. The panel recommended that DNA evidence continue to be used in criminal cases, but called for regulation and oversight of the processes and laboratory techniques. NATIONAL RESEARCH COUNCIL, DNA TECHNOLOGY IN FORENSIC SCIENCE 145 (1992).

73. This is precisely the suggestion made by the National Academy of Sciences, National Research Council which studied the forensic use of DNA mapping. *Id.* at 108-09, 128-29.

74. The allele-specific probe analysis, which does not require as much DNA as the standard "restriction fragment length polymorphism" (RFLP) analysis, determines in a binary way whether a certain allele is present or not. But alleles are concentrated quite differently in different racial and ethnic classifications. A recent study analyzing the accuracy of DNA fingerprinting divided the DNA samples into "major ethnic components" including blacks, caucasians, southeast hispanics and southwest hispanics, and presumed that these groups had "limited mating among subgroups." Risch & Devlin, *supra* note 62, at 718.

ularly if Asians and Hispanics are equally prevalent in the local population.⁷⁵

This glimpse of the potential utility of "suspect classifications" in criminal investigations suggests a very large iceberg. Genes are now being mapped to one of the 46 chromosomes at a rate of about a dozen per week.⁷⁶ Victor A. McKusick, until recently the head of the International Human Genome Organization, estimates that by the year 2005 the location of every one of the human genes will have been found, so that the human gene map will be complete. The number of known inherited characteristics is now close to 5000, with more being recorded every month. Scientists now say they know, for example, that "a specific gene is as intimately connected to one form [of lung cancer] as are cigarettes."⁷⁷

To think about *Sokolow* and DNA typing together is to confront conundra beyond issues of the abilities of human beings doing the testing or matching and judging it. If all evidence is probabilistic, when can we make meaningful distinctions among types of probabilistic statistical reasoning for legal purposes? DNA typing and mapping will soon allow identification of characteristics that match societal concerns of the sort which permit or require control or isolation of particular individual proclivities, but we have hardly begun to explore how such evidence will be gathered and to whom it may properly be disclosed. How many false positives are permissible in evidence considered adequate to be a basis for legal judgment? We lack a coherent legal theory to decide what to do if there are quantifiable "facts" suggesting linkages between individual genes and group characteristics that society generally interprets as essential determinants for either affirmative or negative actions.

This last issue is particularly charged when it informs our treatment of members of involuntary groups. The question arises in many realms, ranging from reparations to affirmative action programs. It stretches from the search for high risks among potential employees or

75. GENETIC WITNESS, *supra* note 66, at 120-21. The authors do identify the problem of variability within defined population groups, such as Asians, which "includes Chinese, Japanese and Koreans, for instance," leading to "insufficient" current data. Thus, "[i]f law enforcement officials use this tool to develop suspects, they will also need to take measures to avoid discriminating against individuals or groups based on racial classifications (e.g., using population statistics to establish probable cause)." *Id.* at 121. Unfortunately, the OTA Report says nothing more on the subject about what protective measures might be taken, or how population statistics might be utilized inappropriately.

76. Barbara J. Culliton, *Mapping Terra Incognita (Humani Corporis)*, 250 SCIENCE 210 (1990).

77. *Id.* at 212 (quoting Victor McKusick of Johns Hopkins University).

the equitable distribution of potential economic losses to possible mental, criminal, or epidemiological bases for detention. What strikes a layperson is that the theoretical debate about evidence among experts today recapitulates the debate in other disciplines, such as history and philosophy, concerning to what extent "[t]heory always influences perception, and not always for the worse."⁷⁸ The looming possibilities and problems of DNA mapping and testing emphasize how greatly answers depend on preferences for generality or particularity, for mastery of the telescope or the microscope, or perhaps for some mastery of both.

Conclusion

The issues of too much generalization and overly intrusive particularization cannot be put to rest. The tragic history of eugenics also casts a long shadow over contemporary claims regarding new knowledge about human genetics, to say nothing of the tragic relevance to the current beginnings of our ability to manipulate human genetics directly.⁷⁹

It may be impossible to escape a basic dilemma: We are zealous to treat every individual with respect and dignity, but this zeal is directly in tension with the growing awareness that involuntary group membership actually helps constitute all individuals. Our differences may be social constructs, but that hardly makes them less significant.⁸⁰ To recognize the malleability of the distinctions we draw does not reduce our propensity to draw the lines between us and them, between each and other. When arguments about crucial differences are cast in terms of gene pools, however, awareness of differences tends to involve elements of guilt by association.

Genetic differences may reveal a great deal about our pasts, but they also may be used to project into the future in ways we are only beginning to understand. To visit the inequities of the fathers and

78. GOULD, *supra* note 2, at 270. See generally, NOVICK, *supra* note 3; THOMAS KUHN, *THE STRUCTURE OF SCIENTIFIC REVOLUTIONS* (1962); KARL POPPER, *THE LOGIC OF SCIENTIFIC DISCOVERY* (1959).

79. See generally, STEPHEN JAY GOULD, *THE MISMEASURE OF MAN* (1981); *Carrie Buck's Daughter* and *Singapore's Patrimony (and Matrimony)* in GOULD, *supra* note 2, at 306, 319.

80. For an insightful and detailed treatment of the issue, concentrating on contemporary legal doctrine, social psychology, and the ways in which the status quo of differences we accept is anything but neutral, see MINOW, *supra* note 3.

mothers on at least three generations is all too familiar.⁸¹ How we answer confusing questions posed by new knowledge and technology in the realm of DNA—if we even pause to ponder the questions—will affect future humankind's values as well as the ways in which humankind defines itself.

There may be increasing sensitivity about the possibility of long term effects of "the disorderly behavior of simple systems."⁸² It has even been suggested that deterministic systems, including complex systems of physics and biology, may produce wild disorder, simultaneously reflecting both structure and coherence. In linguistics, some proclaim a new view that emphasizes the importance in human categorizing of "the internal genetically acquired makeup of the organism and the nature of its interactions in both its physical and its social environments."⁸³ At any particular time, however, all of us, and perhaps particularly those directly connected with law, struggle between what we know, believe, and hope. More than a half century ago, Felix Cohen described the "beliefs that form[ed] the intellectual equipment of [his] generation."⁸⁴ These included:

a belief that the protection of minority rights and the substitution of reason and agreement for force and dictation represent a contribution to civilization, a belief that confusion and ignorance in fields of law are allies of despotism, a belief that it is the duty of the Government to aid oppressed groups in the understanding and appreciation of their legal rights, a belief that understanding of the law requires more than textual exegesis, requires appreciation of history and understanding of economic, political, social, and more moral problems.⁸⁵

This legal realist's creed may be unfashionable, perhaps not even part of today's intellectual equipment. Yet surely Cohen's beliefs are relevant when we confront the morass we have entered, and that the Justices have helped to create, in drawing distinctions between individual and group classifications.

George Annas recently pointed out that pre-Columbian cartographers wrote in the margins of their maps: "Beyond this point there are dragons." We must confront mythical dragons, to be sure, but we also must plan for what Annas aptly refers to as "the real monsters"—the

81. *Exodus* 20:5; *Buck v. Bell*, 274 U.S. 200 (1927) (upholding a state statute authorizing the sterilization of the mentally incompetent), discussed in GOULD, *supra* note 2, at 306.

82. GLEICK, *supra* note 3.

83. LAKOFF, *supra* note 3.

84. FELIX S. COHEN, *HANDBOOK OF FEDERAL INDIAN LAW* xviii (1941).

85. *Id.*

profound ethical issues and value conflicts raised by genetic research, which "will almost inevitably change the way we think about ourselves and what it means to be human."⁸⁶ Nearly a century ago, in the famous "Path of the Law" speech Justice Oliver Wendell Holmes, Jr. gave at the dedication of the new Boston University School of Law building, he referred to history when he advised:

When you get the dragon out of his cave on to the plain and in the daylight, you can count his teeth and claws, and see just what is his strength. But to get him out is only the first step. The next is either to kill him, or to tame him and make him a useful animal.⁸⁷

The tragic history of the ensuing century suggests a third possibility. The dragon may not respect humanity. Today, we ourselves seem capable of endangering and even destroying caves, plains, animals, and even our own existence.

The dichotomy of individual and group discrimination is false, however. It seems essential that we add nuance and caution as, inevitably, we continue to classify in the face of complexity. That we already confront the use of classification as discrimination, and knowledge as the invasion of personality, underscores how acute the problems are at the frontiers of DNA research and technological innovation. This awareness ought to heighten both our concern and our responsibility.

86. ANNAS, *supra* note 5, at 42, 48.

87. 10 HARV. L. REV. 457, 469 (1897).

